SUGGESTIONS

ON

LIBRARY ARCHITECTURE,

AMERICAN AND FOREIGN,

WITH AN EXAMINATION OF MR. WM. F. POOLE'S SCHEME FOR LIBRARY BUILDINGS.

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Associate Am. Inst. Architects.

WASHINGTON:
GIBSON BROTHERS, PRINTERS,
1883.

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Inception of the Congressional Library enterprise.

When, in the year 1872, the Librarian of Congress made his annual report to that body, he called their especial attention to the unprecedentedly rapid and steady increase of the library in his charge. This, he said, was due partly to the law of Congress of 1870, requiring all authors and publishers to deposit copies of their publications in the Congressional Library, partly to the rapidly accumulating articles of the graphic arts, (in the copyright branch,) partly to donations, partly to exchanges, foreign and American, partly to the growing documentary stores received from all the States and from foreign governments, and to the steady (though far less rapid) growth from annual purchases of books. There was also a reference in the report to the great augmentation of periodicals, pamphlets, newspapers, magazines, maps, plates, charts, engravings, music, &c., many of which required more space for their proper storage and preservation than many volumes of books.

This directed the attention of Congress to the necessity of providing additional accommodations for this Institution, which had already outgrown the space and facilities allotted to it.

The Librarian very wisely suggested that steps be taken to provide for the construction of a distinct and separate edifice, wherein this library might find a permanent home—a home fully equipped with the multifarious requirements and modern conveniences of a well arranged and spacious library, so that the operation of enlarging the structure, or the necessity for constructing new annexes might be postponed to the farthest possible period; that the disturbance

so created, which is so serious a detriment to the management, and which causes irreparable damage to the collection, might be postponed as long as possible; finally, that in this way a foundation could be laid for such a library as so great a Government as ours ought to possess.

Such grave disadvantages and urgent necessities had been repeatedly and forcibly brought to the notice of Congress by the Librarian, but without eliciting action until his report of December 2d, 1872, finally called forth the following bill:

Act of Mar. 3, 1873, (first act.)

"*For a plan for a new building for a library of Congress,*
"*five thousand dollars; and the selection of a plan, together*
"*with the location and supervision of said building, shall*
"*be in charge of a Commission to consist of the Chairman*
"*of the Joint Committee on the Library, the Chairman of*
"*the Committee on Public Buildings and Grounds of the*
"*Senate, and the Librarian of Congress.*"

17 Stats. at Large, page 513.

The Commission called into existence by this bill consisted of Hon. T. O. Howe, Senator from Wisconsin, late Postmaster-General; Hon. Justin S. Morrill, Senator from Vermont, and Ainsworth R. Spofford, Esq., Librarian of Congress. The Commission duly advertised a public competition for plans for a separate Congressional Library Building, and as an inducement to architects they offered a first, a second, and a third premium for the first, second, and third best plans submitted. A detailed prospectus was issued to competitors for their information. The terms of the competition were accepted by twenty-eight (28) architects and firms of architects, and as many plans were submitted from all parts of the United States and from England.

Competitors for Congressional Library plans, 1873.

The high standing of many of the competitors should certainly give assurance that the victory was the result of a closely contested rivalry. Prominent among the competitors were Thos. U. Walter, Architect of the Capitol, and president American Institute of Architects; Schulze & Schoen and A. Cluss, of New York and Washington, D. C., respectively; R. S. Spiers and Henry Stevens, London, England; J. D. McLaughlin, Cincinnati, Ohio; Samuel Sloan, Philadelphia; A. J. Bloor, New York, secretary A.

I. A.; E. Williams, Cincinnati, Ohio; F. D. Chandler, Boston; John Fraser, Washington, D. C.; George H. Smith, Philadelphia; A. E. Melander, Boston; Kastner & Beach, New York; Gennrich & Armitage, Philadelphia; Rinn & Cropsey, Boston; John Mitchell, Boston; E. G. Lind, Baltimore, Md.; F. H. Bicknell, Somerville, Mo.; V. C. Klobassa and John B. Brady, Washington, D. C.; Victor Forsberg and P. J. Lauritzen, Washington, D. C.; Frank Schuman and Paul C. Lautrup, Washington, D. C.; H. Luedecke, New York; Frederick Hymers, Washington, D. C.; Starkweather & West, Washington, D. C.; Charles T. Davis, Washington, D. C.; Addison Hutton, Philadelphia; Leon Blauer, Dayton, Ohio.

The result of this competition was the selection of the plans prepared by myself and partner, and the awarding to us of the first premium.

But this was not the only ordeal through which they (the plans) had to pass. On the contrary, it was but the beginning of a continuous open competition of ten years' duration.

With the termination of each Congress (every two years) the committees of the House of Representatives expire, and the Speaker of the House of a new Congress appoints new committees. The new committees are not apt to be familiar with the transactions and ideas of their predecessors, nor are they often inclined to accept the decisions of former committees.

Possibly for these reasons, and doubtless also because they desired to secure the best possible plans, the new Library Committee of 1874 threw open the doors to another contest, and this time a running open competition of eight and a half years' duration was practically initiated, which resulted in thirteen (13) more plans and models being added to the original twenty-eight, (28.) Prominent among the authors of plans submitted during that period were Mr. Wm. A. Potter, of New York, then supervising architect of the Treasury Department; Mr. Thos. U. Walter, of Philadelphia; Messrs. Schultze & Cluss, of Washington; Mr. Woodward, of Texas, and others.

A running, open competition of eight and a half years.

For a time the matter slumbered, but strong necessities

soon brought it up again, and in 1878 the following bill, introduced by Senator Howe, passed Congress:

"[PUBLIC—No. 82.]

Act of June 8, 1880. "AN ACT to provide additional accommodations for the Library of Congress.

"*Be it enacted by the Senate and House of Representatives* " *of the United States of America in Congress assembled*, " That a joint select committee, consisting of three Senators " and three members of the House of Representatives, shall " have power to employ, as soon as may be, at the expense " of the United States, three persons of suitable skill and " attainments, who, or a majority of whom, shall, with the " approval of said committee, carefully examine and con- " sider what practicable and beneficial changes can be made " in and of the Capitol building in the District of Columbia, " for the better accommodation of the Houses of Congress " and of the Congressional Library, having in view especially " the need of better ventilation, light, and exposure to the " open air of the legislative halls, and the convenience of " communication between them, and between them and the " Library, and the need of greater space and better arrange- " ment thereof for the Library. They shall, if they find any " mode or modes of accomplishing the ends aforesaid prac- " ticable and beneficial, cause proper plans, designs, and es- " timates of cost to be made thereof, and submit the same " to said committee, which shall report the same to Con- " gress at the earliest practicable time. And said com- " mittee shall in any case make a full report on the sub- " ject, and especially whether such mode of providing for " the Library is preferable to the erection of a separate " building for that purpose.

" SEC. 2. That said joint select committee is also author- " ized and directed at the same time to examine the ques- " tion of a site outside the Capitol for the Library of Con- " gress, and report to Congress what locations would be " most suitable for the Library and afford the highest ad- " vantages for its future growth and permanent accommo- " dation, and also in the case of each site the probable cost " of the same and of the building.

" SEC. 3. The sum of five thousand dollars, or so much " thereof as shall be necessary, is hereby appropriated, out " of any money in the Treasury not otherwise appropriated, " for the purposes named in this act, which shall be paid on " vouchers approved by said committee.

" Approved, June 8, 1880."

The committee appointed by this bill consisted of Senator D. W. Voorhees, chairman of the Joint Committee on the

Library; Senators Francis Kernan and Justin S. Morrill; Hon. Geo. W. Geddes, representative of Ohio and chairman of the Committee on the Library; Hon. Philip Cook and Hon. William Claflin.

This commission named three experts, viz: Mr. Edward Clark, Architect of the United States Capitol Extension; Mr. Alexander R. Esty, Architect of the United States Post-Office building in Boston, and J. L. Smithmeyer, architect, of Washington, D. C., and instructed them each to submit plans for a new and separate building for the use of the Congressional Library, together with their report on the feasibility and practicability of extending the Capitol building for the purpose of affording additional accommodations for the Library of Congress, for the Courts, and for Congress. These experts made their reports to the Committee and submitted their plans. The result of this limited competition was highly favorable to me, as the plan I had the honor to submit was unanimously adopted by the Committee and recommended to Congress. This outcome was the more flattering to me, as I had submitted the plan which took the first premium in 1872, and which successfully passed through all kinds of competitions covering a period of ten years, and against forty and more of the most formidable competitors. In conjunction with this plan I submitted several elevations, which, together with those furnished to the committees at various times, formed an aggregate of six, in six different styles of architecture, but every one of which will suit the interior arrangements of the plan adopted, with very slight modifications.

The purpose of all this labor on my part must not be looked for in a desire to display skilfully-made pictures, but to illustrate the fact that the highest achievement in architectural art consists in causing the beauty of a structure to spring from and to be produced out of its fitness for the purposes for which it is intended, without reference to the particular style of architecture employed. The selection of a style depends upon a variety of contingencies. Were it otherwise, architecture would be no more than the offspring of a heated brain, a jumble of forms, or an aggregation of conceits.

During the interval between 1872 and the close of this

competition between the three experts the actual number of competitors had swollen to forty-one, (41,) viz:

There were in the			1st open competition	28 plans
"	"	"	2d limited "	3 "
"	"	"	voluntarily contributed competition	2 "
"	"	"	order by the committee competition	2 "
"	"	in connection with the enlargement of the Capitol Building		6 "
			Total	41 plans

Forty-one plans submitted in competition.

The dispute over the site for a Library, which has been raging for ten (10) years with more or less vigor in the Halls of Congress, and which has greatly delayed the consummation of this grand project, broke out afresh when the Committee brought their report and recommendation before that body for sanction and adoption, and, as usual, all disaffected elements combined for a defeat.

A number of members favored and supported the report of the Committee, but their number was not large enough to secure its adoption. Many desired more information on the subject.

Influenced by the wishes of this latter class, the Committee deemed it advisable to extend the circle of inquiries, if possible, and in so doing turned their eyes to Europe, the country of the most extended experience in this direction. An examination by an architect of the systems and characteristics prevailing in the great libraries of the Old World was the only source left to draw information from, and it might be apprehended that a liberal interchange of ideas between him and experienced European librarians would be productive of the largest benefits. Soon after the adjournment of Congress I crossed the Atlantic for that purpose. I began with the Liverpool Library and Picton Reading Room, the British Museum Library, the South Kensington, Temple Bar, Guild Hall, and other renowned libraries in England. I then directed my way to the Continent, and made a tour through Northern and Middle Europe, principally through France, Germany, Austria, and Belgium. I examined and studied the various systems and characteristics of the greatest, the oldest and the most renowned,

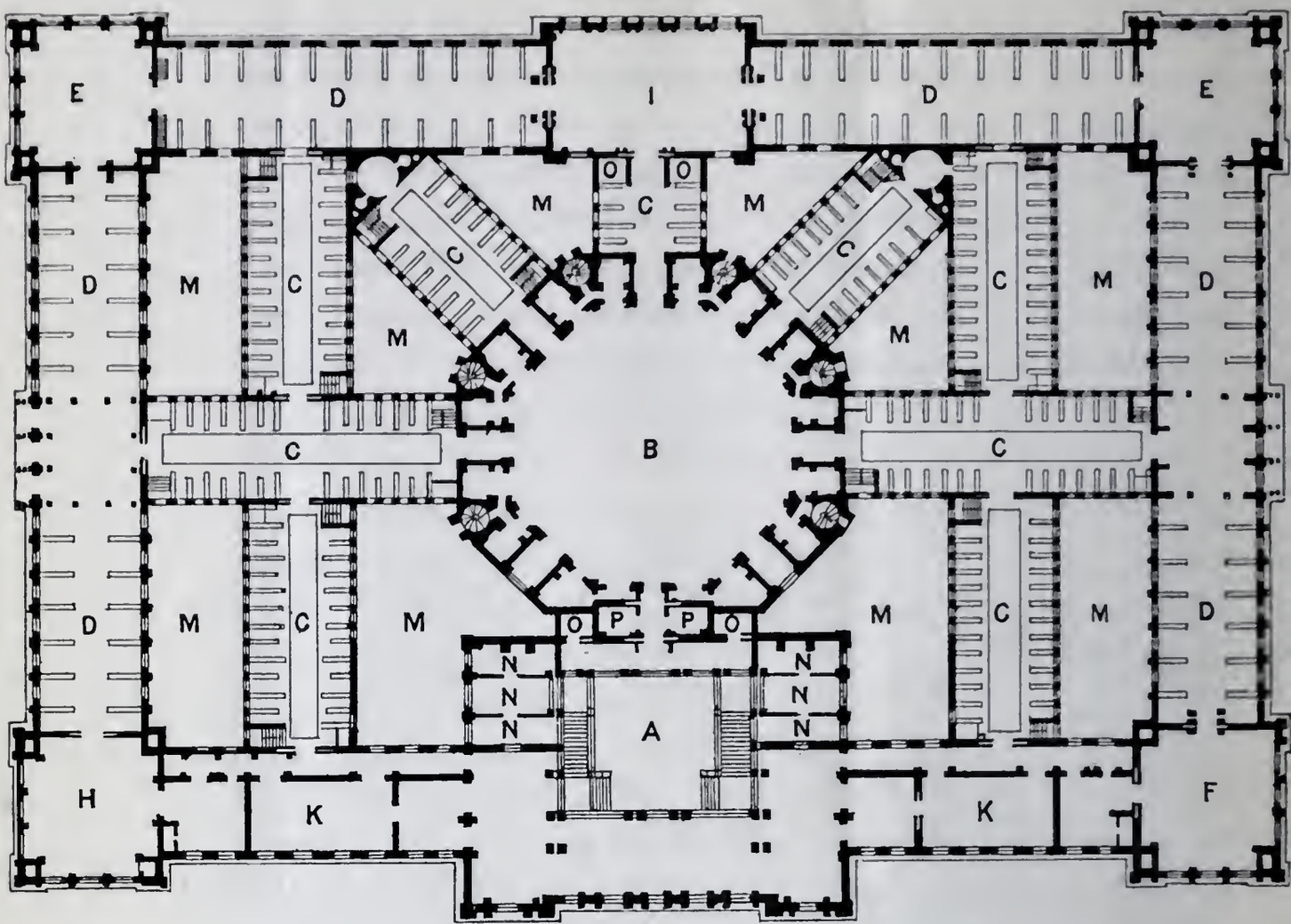
A visit to the European libraries.

as well as some of the newest libraries of the Old World. I conversed freely with the librarians of those institutions, (to whom I am under obligations for varied courtesies,) and gathered such photographs, drawings, books, sketches, measurements, computations, and other information as I am sure will prove very valuable in time. Certainly, if they shall not prove of service to the Government in this behalf, they will always be treasured by me. Having made for upwards of twelve years the study of library architecture a specialty, I have omitted to acquire nothing which might enrich my knowledge on this subject. My investigation of all the larger and newer libraries in this country, my thorough and exhaustive inquiry into the systems of the Old World, have given me a right to speak on this subject with more confidence than I should have otherwise possessed.

I preface my reply to Mr. Poole's Report on the "Pro-"gress of Library Architecture" with this brief sketch of the library project from its inception in 1872, for the purpose of refreshing the recollection of the reader as to the earlier events connected with this grand enterprise, and to show conclusively that no labor nor means have been spared, either by the Committees of Congress, the indefatigable Librarian of Congress, or by the architect whose plans have been adopted, to insure the widest satisfaction.

It is a source of deep regret that my European investigation could not have been made public before, else many of the objections of Mr. Poole could not have found a place in his report.

When the vast amount of professional talent aggregated in the production of the forty-one plans above referred to, all embodying ideas of merit, is taken into consideration, together with the fact that the views and opinions of the most experienced librarians of both worlds, and especially of the gentleman who now presides over the Congressional Library, have been collected and considered, it seems strange that radical errors, such as are mentioned by Mr. Poole, should have crept into the product of all these efforts and of all this experience.



Plan Adopted by the Joint Select Committees of the 46th and 47th Congresses.

A. Stair hall, &c.
B. Public reading-room 100 feet in diameter, (like the London reading-room.)
C C C C C C C C C C C C. Book repositories, (five stories high, like the grand library in Paris.)
D D D D. Book repositories in first story, and halls for exhibits of the graphic and fine arts in second story.
E E. Collections of rare manuscripts and specimens of typography.
F. Rooms for Executive and Judicial officers, Senators, and Representatives.
H. Room for special students.
I. Washingtoniana.
K K. Administration of the library in first story and copyright records in second story.
M M M M M M M M. Open courts for additional light and air.
N N N N N N. Janitors', ladies' rooms, gentlemen's rooms, and lavatories.
O O O O. Public elevators.
P P. Coat rooms.
22 stairs for attendants and 16 elevators for attendants.

Remarks before the American Library Association in 1885.

About three years ago, upon invitation, I appeared before the "American Library Association," in their fourth annual convention in Washington City, for the purpose of displaying and explaining the above plan of the Congressional Library, to which the first premium was awarded in 1872, and which was subsequently adopted and recommended to Congress by two different Committees (in 1880 and 1882.) This plan, together with my remarks, were subsequently published in the "*Papers and Proceedings*" of the association.

I began my remarks by saying: "*Of all the tasks an* "*architect may undertake, that of building a library is*

" *the most difficult*," and I should have added " *especially* " *when the authorities disagree on the essential points of the* " *problem.*"

The greatest as well as the smallest libraries of the Old World, and all the libraries of the New World, large and small, are built to accord with certain inflexible conditions, such as *climate*, *locality*, *site*, *surroundings*, *capacity*, *special application*, *use*, *cost*, *nature of building materials*, &c.

No one plan can fully suit every library.

" To accept any one plan—whether tested by trial and " approved by experience, or still on probation—as an in- " fallible model for imitation under *all* circumstances would " be a grave error, because there are no two libraries of ex- " actly equal requirements, and each one is erected and fitted " up under peculiar and often heterogeneous influences. " But to imitate single features of interior arrangements, " which have been found acceptable under a contemplated " programme is not only unobjectionable but absolutely " necessary, because it is impossible to devise for every " library new, practical, and distinctly different features, " but even such examples should be modified according to " the necessities of the prevailing circumstances, yet never " without due reference and deference to the controlling " element of all libraries, viz., light, day, or sunlight, which " can neither be substituted or reproduced by scientific " means. It is further not to be forgotten that a system of " fixtures, however commendable for a private library, may " be anything but advantageous for a circulating or college " library, nor that one for a specific purpose, for instance " for a law library, will answer for a parliamentary library, " and it is certain, beyond argument, that no existing sys- " tem, AS IT IS, will come up to the demands of our contem- " plated Congressional Library, with its numerous ramifica- " tions and enormous annual growth. It would be useless " here to discuss the libraries most prominent in the world " in all their merits and defects, as no such institution, " either in the Old or New World, in the past or present, re- " quired such extensive premises and manifold arrangements " as the Congressional Library of the United States, which, " in fact, is to be more of a *museum of literature, science,* " *and art, than strictly taken a collection of books.*"

The Congressional Library a museum of literature and art.

" In consequence of this, provisions will have to be made " for the hosts of visitors and curiosity-seekers, as well as " for the ease, quiet, and comfort of readers or students; " and besides the ample halls and apartments needed for in- " quiry and search of Congressmen, scientists, and literary " men, and the premises of great importance, such as pack- " ing, binding, distributing, and other rooms, there will have " to be ample passages for the throng of spectators.

"There have been made objections to wide passages in a "library on the ground that a library is not a *show place*, "but a retired place for quiet and calm inquiry and study; "but such an objection is not tenable as to a Congressional "Library in conjunction with which articles of the graphic "arts are to be exhibited, which is essentially of a public "character, and in which the mere observation of its ar- "rangement and management is in itself an object of inter- "est and study, like a museum; and there are enough sep- "arate provisions made for the pleasure and curiosity of the "mere spectator so as not to interfere with the ease and "other claims of the reader or student.

The Library must be open to the public.

"To refuse to our public an inside into the colossal array "of knowledge which the human mind has accumulated "and still gathers together, and into the enormous ma- "chinery required for the access to and the utilization of "every part of these intellectual riches, would not only be "antagonistic to our free institutions, (which secure admis- "sion to every department of the Government buildings, "the Capitol of the United States, and even the White "House,) but would be also directly in discord with the spirit "of the age.

"Experience in both hemispheres has established the so- "called '*alcove*' system as the most popular and practical "and securest arrangement against fire for book-cases and "shelves—for grand libraries like Paris, London, &c.—by "projecting them a suitable distance (at right-angles with "the wall) into the room between the windows, in as many "tiers or stories as practicable, so as to secure the best light "obtainable.

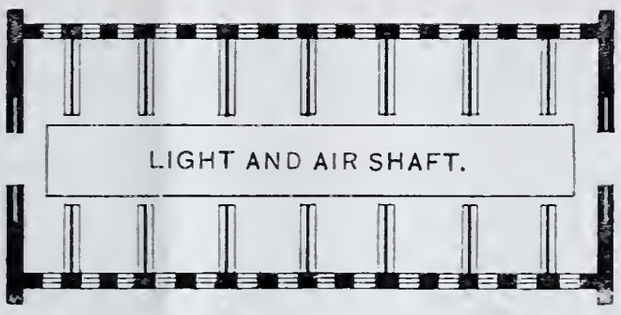
Elasticity of the interior arrangement.

"Using the present *alcove* system for the present de- "mand, we can at any time hereafter, when necessary, econo- "mize space by adding rows of double shelves or cases "between the shelves, now forming the alcoves, placed par- "allel with the alcoves, and thereby increase their ca- "pacity fully by one-third. Moreover, by closing the well- "holes, light-shafts in the center of the apartments, we can "economize space by introducing the stacking system, used "in Harvard College, Mass., and other libraries, and thus "gain a very great additional capacity of books. And by "finally removing the exhibits of the graphic arts from the "library building, the large apartments designed for their "use could be fitted up for the accommodation of books, and "thus the capacity of the library be still further increased "from $2\frac{1}{2}$ or 3 millions to 10 millions, and all this can be "done without the annoyances and irreparable damages "befalling a library from the building operations of annexes "or other structural enlargements."

It is my aim, in other words, to provide a liberal amount

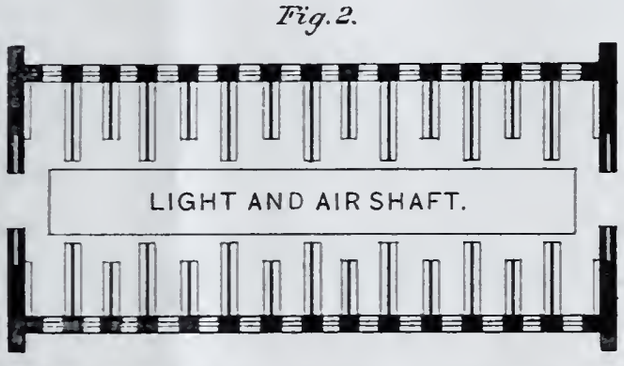
of space in the beginning, when I use the alcove system, (Fig. 1,) and as the space becomes scarce, owing to the ac-

Fig. 1.



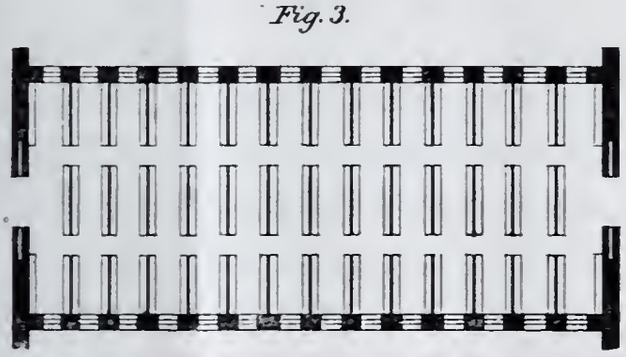
cumulation of books, I propose to divide the alcoves in the center by additional cases, (Fig. 2;) and when still more

Fig. 2.



space is needed I propose to close up the well-holes or light and air shafts in the rooms and put cases across the room in stacks, (Fig. 3;) and finally I propose to remove the ex-

Fig. 3.



hibits of the graphic arts from the premises and devote that enormous space to book repositories.

"In summing up, the leading *motifs* which guided me in "the preparation of this plan may briefly be stated:

"1. Centralization towards the circular reading-room," (which contains likewise the entire management of the library, like the London Reading-Room.)

For this reason this plan is known in Europe as the "*Central system.*"

"2. The acquisition of the greatest amount of light pos-"sible for all parts of the building.

"3. The best arrangement for the expansion of its interior

" capacity, *i. e.*, to meet the present demands and likewise " those of a hundred years hence without extending the " building.

" 4. Easy accessibility and control of all parts of the " building to the librarian, as well as the visiting public.

" 5. The best arrangements for an economical adminis- " tration.

" 6. The division of the structure into so many absolutely " fire-proof and isolated compartments.

" 7. Placing the greatest amount of shelving space as " near the centre—*i. e.*, the central reading-room—as pos- " sible for the convenience and economy of time to all par- " ties concerned.

" While libraries for special purposes may present differ- " ent and, for their special needs, better arrangements than " those which I had the honor to place before you, yet you " will pardon the assertion that as it is the result of close " observation and study of this subject for upwards of '*eight* " *years*,' it might deserve your consideration, especially as " some of the leading librarians of this country and of the " old world were consulted on the various and most import- " ant points in the make-up of this plan for a Congressional " library."

I have quoted so extensively from my own remarks made in 1880, before the American Library Association, because the additional experience and knowledge I have acquired since, by reason of my European tour, has greatly strengthened my conviction of the excellence of the system as proposed in the prospectus of 1872 and carried out in this plan for the purposes of a Congressional library. The plan in controversy was made in accordance with a prospectus which clearly stated the problem, and defined the conditions of the competition to which it was submitted. There obviously was not one architect among the many distinguished competitors whose plan varied in any of the essential requirements of the prospectus, and it is but reasonable to presume that because my plan embodied more fully the requirements set forth, and has, therefore, interpreted Mr. Spofford's—*not Mr. Poole's*—idea of a Congressional library more minutely, that it was preferred to others; and I am very proud of that fact.

That both the plans and the method of construction of *some* of our libraries are faulty, (Mr. Poole asserts they are

all radically wrong,) and that a sort of venerable style in this kind of architecture has become the fashion, is perhaps true.

But Mr. P. has doubtless in view the smaller libraries of the country, and libraries built for specific purposes, such as law, medical, and circulating libraries, and not a library of the character under consideration. But Mr. Poole's doubts and difficulties in this behalf ought not to give much trouble or alarm. The remedies are close at hand and easily applied. The real cause for alarm among students of "library architecture," and custodians of large and valuable collections, is caused by the fact that an extensive destruction of books in the large libraries is constantly going on in the upper stories or galleries. While it is now ascertained that the accumulation of heat and its intensity, together with the rising dust, is the cause of it, no reliable remedy seems to be known. There are various means by which most of the faults attaching to these smaller collections can easily be avoided. I venture the assertion that every intelligent librarian will be able to point out and suggest a remedy for every fault in his own library, even to the extent of avoiding venerableness or conventionality in style. But the entire American Library Association has been able to discover no effectual remedy for the last-mentioned danger.

Mr. Poole's objections not of an alarming nature.

The real cause for alarm.

When twelve years ago I concluded to make the study of library architecture a specialty, I was working on the competitive plans for the Congressional Library. Information on this matter was very scarce, and I had to rely principally upon my own observation and such interviews with individual librarians as I was able to obtain. These latter could give me information concerning their own libraries; but such information I found I could make little use of in designing a work of the size, character, and requirements called for in a Congressional Library. The time of the Congressional Librarian is always fully occupied. Besides, he had issued his prospectus, which contained all I had a right to ask as one of the competitors. Nothing remained for me to do but to read and study everything I could possess myself of that could give information about large public libraries. In my pursuit I soon found that "light," "heating and

"ventilation," and "security against fire and dampness" are the fundamental points to be taken into consideration in designing a library building, and that all other considerations, though of much importance, must be regarded as subordinate to these. I consequently selected "light" as my first study, "heating and ventilating" as my second, and "security "against fire and dampness" as my third.

LIGHT.

To the subject of light, which I consider paramount to all others in the construction of libraries, I have devoted a great deal of my time. I have given careful attention to its study, and have made computations from actual measurements of its quantity and conditions in each of the large reading-rooms I have visited. The result of my observations is given in the following statement:

In the *Reading-room* of the National Library in Paris, 1 square foot of light to 428 cubic feet of space.
St. Genevieve, Paris, 1 square foot of light to 200 cubic feet of space.
British Museum, London, 1 square foot of light to 191 cubic feet of space.
Picton, Liverpool, 1 square foot of light to 795 cubic feet of space.
New University Library, Vienna, Austria, 1 square foot of light to 132 cubic feet of space.
In Congressional Library, Washington, D. C., 1 square foot of light to 95 cubic feet of space.

I first considered the subject of day- or sun-light, and afterwards of artificial light.

The effect of day-light in rooms illuminated by it depends not only upon the quantity of light admitted, but upon the direction of the light, whether taken from near the horizon or the zenith; also upon the quality of the glass through which it passes, its condition of cleanliness, the number and thickness of the sash bars, and other obstructions in the window surfaces, as well as the atmospheric conditions of the locality, the conditions which the rooms afford for reflection of light, (*i. e.*, the color of the walls and objects in the room,) and the location of the rooms in relation to the points of the compass.

Light should be introduced perpendicularly.

It is evident that the daylight which reaches us vertically from the zenith must be the most powerful, as it passes through the least thickness of the atmosphere encircling our globe, and in proportion as the rays of light are received in a horizontal direction the less effective they must become, as they have to pass through a greater thickness of atmospheric air, more or less filled with suspended particles of vapor, dust, and smoke, all tending to impede their passage, until such objects as hills, trees, and buildings bordering on the horizon entirely shut out the source of light. Experience has taught that in large and compactly-built cities, with high buildings and narrow streets, the rays of the light taken from the zenith are the most reliable, as they are least obstructed by any objects in close proximity. In different countries the capacity of the atmosphere to transmit light greatly varies. For instance, Italy and the Middle States of America have a clearer and more translucent atmosphere than France, Austria, Germany, and England, owing to their climatic conditions. Again, the prevailing atmosphere may in a great measure be influenced by local conditions. For example, the immense volumes of soft coal smoke which overhang the great cities of England during calm weather obscure the daylight very perceptibly. It is from these causes that the Bibliothèque Nationale, in Paris, lighted vertically, is quite as well lighted as the Bibliothèque St. Geneviève in Paris, lighted by side windows, although the latter has twice the amount of window surface to admit the daylight. The Liverpool Reading-room is better lighted than the British Museum Reading-room, notwithstanding the latter contains the greater proportion of window surface. But an examination of the sources of light in each will show that the Liverpool Reading-room receives its light vertically and almost unobstructed, while the best source of light in the British Museum Reading-room — the sky-light — was found to be obstructed by a covering which greatly obscures the light. The ratio of the lateral (or window) openings to the above sky-light is as 26 to 6, and it is upon the former mainly that this reading-room depends for its light. On foggy days, or when the air is calm, and the smoke of thousands and thousands of soft-coal fires overhangs the city, it is but natural that any one not accustomed to the task very soon feels his power of vision affected by reading there.

Comparisons.

In order to obtain the best results for the convenience of the readers and the arrangements of the reading-tables and desks in reading-rooms with that view, the efforts of the librarians and architects abroad (where they give much attention to this subject) have been directed in a majority of cases towards obtaining light from as many openings as the nature of the building would permit; and as much as possible *vertical light*. The more diffused the light is in a reading-room, the more agreeable to the reader, and the better will be the the chances for obtaining good light in every part of the room.

Light should be admitted thro'gh as many openings as possible.

It was with this object that the windows in the Bibliothèque St. Geneviève, in Paris—which are against the ceiling—have been placed on all sides of the room, and with excellent effect for the reader. The Government Department buildings in Washington represent the best quality of public structures in the country; they are located on large open lots, with wide streets or avenues surrounding them on all sides; the Washington atmosphere is translucent and clear; there are no factories here; there is little smoke, vapor, or dust which would impede the passage of the rays of light. The rooms in these buildings are 15 feet high and more, the windows large and plentiful, and the glass of the purest French plate, and yet experience has proven that twenty feet away from these windows the light in these rooms is defective and insufficient for the writer or reader. Mr. Poole's plan contemplates 24 rooms which are each 50 feet deep and 57.6″ and 67.6″ wide; if there are windows on two sides of these rooms, throwing in *direct* light, there would be ten feet of space comparatively dark, reasoning from that fact. Now, Mr. Poole does not get *direct* light from his rear windows, which are overshadowed by iron corridors, stairs, sky-lights, &c., therefore, any light he receives beyond the first twenty feet from the front windows is of little account. In the Bibliothèque Nationale, where lateral windows do not exist, nine separate sky-lights give a well-diffused light. Reading-rooms lighted only by a single sky-light have the disadvantage that unless that light is of very large size the reader's head will shadow his book as he bends over it. Undoubtedly the system of lighting the British Museum is the most perfect, and its partial failure is,

Light in the Government buildings in Washington, D. C.

Mr. Poole's arrangement for light inefficient.

as stated before, due to the impaired usefulness of the skylight, and to the generally wretched condition of the atmosphere. As it is, it would be a success in the brighter climate of America or Italy. Mr. Poole's rooms would prove deficient in that respect.

ARTIFICIAL LIGHT.

The British Museum reading-room, the Picton reading-room, Liverpool, and the South Kensington room were the only three that were kept open of evenings, and in all of these the electric light is used with varying success according to the quality of the respective apparatus. The electric light is regarded as more agreeable to the eye and less injurious to the health of the readers than either gas or coal oil, and a better preservative of the books. Much attention is paid to the remarks made by Mr. Cowell, librarian of the Liverpool library, before the library association of the United Kingdom on this subject. They were published by the Cambridge Chronicle and University Journal and by the Cambridge Independent Press and University Herald, under date of Sept. 9, 1882, in which he relates his own experience with electric light, and gives his reasons for advocating its use in libraries, and especially in reading-rooms.

Electric light preferred.

HEATING AND VENTILATING.

Next to light, the subject of heating and ventilating libraries and other structures, such as hospitals, theatres, music-halls, churches, &c., occupied my attention.

There is very little information extant in regard to heating and ventilating the gigantic libraries of the Old World. In fact, very few of them are heated in any part of them except their reading-rooms, and yet they were the only ones that could serve me as models. I studied carefully all the information I could get on that subject, viz., the report of the experiments of the British Parliament, conducted by Mr. Gurney, in 1854,–'5, and '6, which was very extensive and exhaustive; the report of the great test made in the Grand Gürzenich Hall and building in Cologne, Germany, which attracted the attention of the architects and engineers of all Europe; the report

New system of ventilation.

of the grand trial and successful introduction of the new system in the reading-room of the Bibliothèque Nationale in Paris; the account of the introduction of this system in the Imperial Clinic at Potsdam, Germany; the great public hospital in Berlin, and some others. I also inspected the Ninth National Bank of Broadway, New York city, the Masonic Temple in Philadelphia, and the Norristown Insane Asylum, where the above system is in use. I afterwards continued my studies on the subject during my tour of the European cities mentioned above, for the purpose of familiarizing myself with the workings of this system and its peculiarities. It needs no telling that I became fully convinced of the superiority of the system which is called the "vacuum," or down-draft system. And in the study of it I found the solution of the calamitous problem—regarding the destruction of books in the upper part of libraries by heat and dust. I state here, without fear of contradiction, that the whole trouble originates in the defective, absurd, and costly methods of heating and ventilating, and by no means in the plans and constructions of our libraries. The words "*down-draft*" indicate that the motion of the air is downward instead of upward. It is a well known fact that the gravity of pure air depends upon its temperature, and that air of higher temperature seeks a higher level than that of a lower temperature. Vitiated air has greater gravity than pure air of the same temperature. The coldest air in a room is, therefore, always found at the floor. By the down-draft system the cold air is exhausted at the floor by means of an exhaust fan or by fire in a stack. This exhaustion of air creates a partial vacuum at the floor of the room, which the warmer air above is bound to fill. This is the true and only solution of the problem of ventilation. The twin problem is that of heating. The fresh, cold air is heated in various ways—by fire, steam, or hot water, and is carried from the heating apparatus in the sub-basement (through air ducts or flues, built in the thickness of the walls) up to the desired height, where it is let into the room. For the sake of clearness and for a better illustration of the close connection of the two functions of this system, I will suppose that the entire apparatus is set up for use; that the exhaust fan under the floor is ready to

This system obviates the destruction of the books in libraries.

Is called "Vacuum" or down-draft system.

How it works.

draw the cold and the vitiated air out of the room, while the warm air from the heating apparatus below is already in the air-flue, and at the desired spot, to come into the room.

At the very instant that the fan draws out a certain quantity of cold air at the floor an equal amount of warm air comes into the room above. The one comes in exact proportion as the other is removed, and this process will continue as long as the fan will exhaust or ventilate the room. The very minute that the fan ceases to ventilate, (exhaust,) that very minute the fresh, warm air stops coming down the lower level of the room to warm it. This shows conclusively that it is not possible to heat a room by this system without ventilating it simultaneously—these two functions being absolutely inseparable. In summer time the motion of the fan is reversed for the purpose of bringing cool air into the room. The introduction of this system for heating and ventilating the Congressional Library will not only overcome the calamity mentioned, but will prove healthier and more economical than all other systems.

Heating compels simultaneous ventilation.

SECURITY AGAINST FIRE AND DAMPNESS.

Security against fire and dampness was my next consideration. Every practical architect is familiar with this subject. It is therefore comparatively easy to master.

I am well aware that so-called fire-proof buildings have repeatedly been destroyed by fire. But I am also aware that a building made of *non-combustible* material is NOT a fire-proof building; and that if non-combustible materials, such as iron or steel, are indispensable in the construction of fire-proof buildings, they should *be made* actually fire-proof by being protected against fire with fire-proof materials. If this precaution is taken, and no combustible material of any kind is used in the construction and outfittings; if the floors are made of tiles or marble, the doors and inside shutters made of double thicknesses of sheet-iron filled in between with asbestos; if the stairs, railings, elevators, and shelves are made of iron, and the partitions between the double shelves made like the doors and shutters; and, finally, if the shelves upon which the books rest are made of slate or some other smooth stone, I am quite sure the books will be as secure as

Non-combustible material is not fire-proof material.

Division and sub-division of the building into separate and isolated fire-proof compartments

human ingenuity can make them. If, further, the building is divided into fire-proof compartments, with heavy brick walls between them, with double sliding-doors made of iron and asbestos to fully separate and isolate each compartment from the other, and each alcove from the other, in case of a fire, I say the highest form of security is attained. I would thank Mr. Poole for suggesting something more perfect. And this is the way the work is contemplated to be done: Observe that I do not propose to use *hard-wood* floors and *hard-wood* book-cases in a fire-proof building, as Mr. Poole does, because I regard them as *very dangerous*.

But to protect a structure and its contents against destruction by permanent dampness is not so easy a task. "*Hic* "*labor*, *hoc opus est.*" I do not now refer to dampness by occasional humidity in the air during the rainy seasons, &c.

Dampness is as damaging to the books as fire, the process only being slower.

Against *that* dampness I propose to use hollow bricks of some approved form which will allow a constant circulation of air through the walls to keep them dry. The dampness to which I do refer, and which is most dangerous, is occasioned by the noxious exhalations of a gaseous nature which constantly issue from the earth in low places, and which are deleterious or fatal even to animal life. This damp atmosphere permeates stone, brick, iron, and, in fact, every material it comes in contact with, and prematurely destroys them. There is no effective remedy known to prevent this. At certain times of the year it is greater than at others, but at all times it is very deleterious.

It attacks and dissolves the glue in the paper and the bindings of the books; it discolors, mildews, and ultimately decomposes books and papers, old parchment manuscripts, rare old writings, lithographs, maps, engravings, &c. There is only one way to avoid this destruction by dampness, viz., by *selecting a site* which lies *high and dry*, and which will expose the whole structure to the constant circulation of fresh and dry air.

ECONOMY.

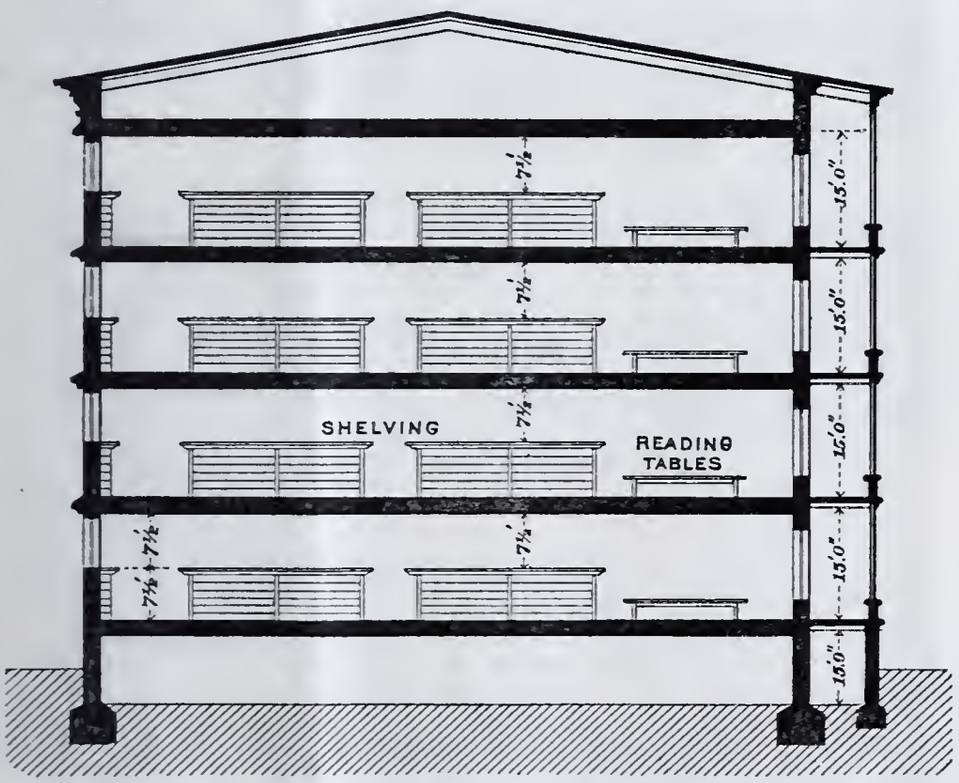
Economy claims the next consideration. A prerequisite for the proper study of economy in architecture, especially in "Library Architecture" is a familiarity with the scientific branches of architecture and their various applications to libraries. There is no special architecture for libraries.

Knowledge is necessary to sound judgment.

Thorough knowledge of the rudimental principles of these branches is indispensable, because a full understanding of their practical uses is absolutely necessary for the exercise of that judgment which enables one to distinguish *true* from *false* economy.

Mr. Poole places great stress upon "economy." He claims to have achieved great feats of economy in three different ways. First, *in space;* second, *in cost;* and, third, in the *physical* energy of the attendants. *We shall see.*

Mr. Poole's plan contemplates a structure of 200 by 200 feet on the ground, four stories high, with a basement, each story to be 15 feet high. The basement is supposed to be used for newspaper-files, for music, periodicals, and pamphlets—articles which occupy less space than books; but I have made no distinction in my calculation between them.



Section of Mr. Poole's Plan.

Excessive waste of space in Mr. Poole's plan.

Mr. P.'s book-cases (shelving) are 7½ feet high, and his rooms are 15 feet high; thus he utilizes just one-half of his available space. The capacity for books by this arrangement is 505,000 vols. for each floor; when, if he had utilized all the available space, he could have accommodated double that amount, or 1,010,000 vols. in each story, making a waste of space for 2,525,000 vols. in the five stories, or one-half of the capacity of the whole building. In other words, a building of half the size of this would accommodate the same number of books. And there cannot

be any other reason assigned for this *stupendous waste* of space than pure ignorance of any other mode or way to solve the vexing problem of "how to keep the books in the "upper stories or galleries of libraries from being destroyed "by heat or dust." So much for Mr. P.'s economy of space.

And now we will look into Mr. P.'s pretensions to economy in cost.

This plan of 200 x 200 feet, Mr. Poole asserts, can be erected and completed (including the heating apparatus) for the sum of $530,000, and he gives this as a proof of his economy of cost.

This building contains 200 x 200 = 40,000 sqr. feet of surface measure; the stories are 15 feet high each, including the basement; the thickness of the floors, (arches, iron beams, &c.,) are 1½ feet each; the roof on a building 60 feet high, could not well be less than 20 feet high, and the foundation walls and footings 6 feet deep, which, summed up, gives these figures:

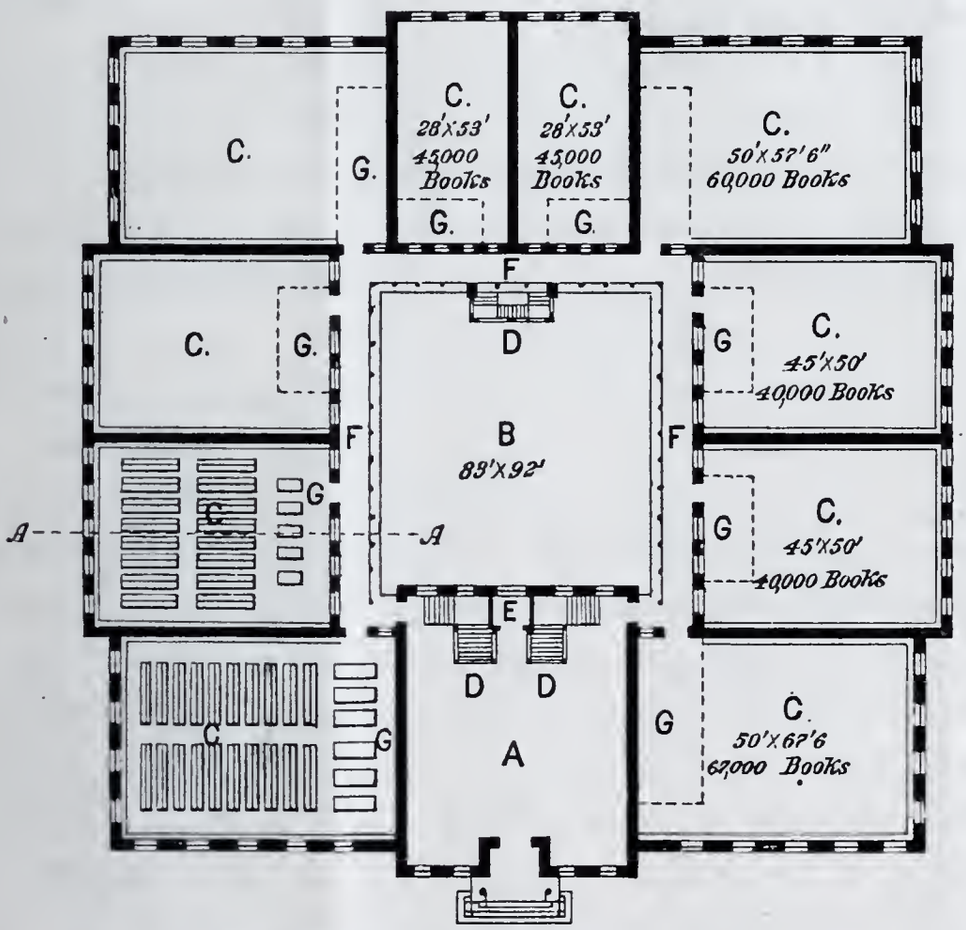
	Height in feet.
Foundation and footings	6
Basement	15
4 stories @ 15 ft	60
6 floor thicknesses @ 1½ ft	9
Customary average of roof	10
Total	100 ft.

(N. B.—A library building should by all means have a sub-cellar for dryness.)

By multiplying the surface measure, 40,000 feet, by the height of the building, 100 feet, we get 4,000,000 cubic feet as the solid contents of this structure.

By dividing the solid contents with the estimated cost of the building, the cost of one cubic foot will be ascertained to be 13¼ cents per cubic foot. This is a price for which not even an ordinary brick and wood building can be built in Washington. For the better information of persons who desire to make their own estimates on buildings of that kind I will give a few official figures of the cost of fire-proof buildings per cubic foot. The Government building in Knoxville, Tenn., faced with Knoxville marble—(which is as cheap there as sandstone would be here)—cost 71 cents per cubic foot. The Government building in Omaha, Nebraska, faced

with sandstone, cost 54 cents per cubic foot. Buildings faced with granite like the New York post-office cost as much as 98 cents per cubic foot. In view of these figures I deem it perfectly fair to take the cost of the lowest sandstone faced building as a criterion and calculate the cost of Mr. Poole's structure by it. This is, more especially, a fair test, because Mr. P.'s specification calls for an *absolutely fireproof building* and for *many* other things which do not usually enter into our Government buildings. But here is Mr. P.'s own plan and specification, and the reader may judge for himself:



Mr. Poole's Library Plan—(200x200 feet.)

N. B.—It will be seen that in the above plan Mr. Poole, in the rooms at the opposite end of the building from the main entrance, which measure 28x53 feet and contain 1,484 square feet each, proposes to put 45,000 volumes per room, while in the rooms to the right and left of the area, measuring 45x50 feet and containing 2,250 square feet each, he proposes to place only 40,000 volumes per room.

These discrepancies scarcely speak well for Mr. Poole's excellence as a computer. Such looseness in arranging details as is indicated by this one may account for many of the mistakes and errors so evident upon the face of Mr. Poole's plan.

A. Room for administrative superintendence.
B. Area, with stair and corridors.
C C C C C C C C C C C. Book repositories.
D D D. Stairs.
E. Elevator.
F F F. Corridors.
G G G G G G G G G G G. Tables for readers.

Mr. Poole's specification of materials.

"The estimates are made on a building such as has been "described, covering a lot of 200 feet square, five stories "high, including the basement, and having a capacity of "shelving 2,000,000 volumes. The exterior will be of sand-"stone, in simple yet characteristic design. The building

" is to be *absolutely fire-proof*, with brick walls and iron " beams, iron window-frames and sashes, *and steel inside* " *blinds* for all the exterior windows. The interior iron " work will be covered with *porous terra-cotta* or other fire " resisting materials. The floors in the back rooms will be " of hard wood, and in the vestibule and inside corridors of " tiling. The walls of the same will be *wainscotted in stone* " *and tile*. The cost of the building complete, including the " steam apparatus for heating, will be $530,000." (N. B. The italics are my own.)

Taking 54 cents per cubic foot as a fair figure, Mr. Poole's building will cost $2,160,000, instead of $530,000, or $1,630,000 in excess of his estimate.

Mr. Poole's book-cases are intended to be made of wood, while mine are intended to be of iron and stone, (as they should be.) This difference amounts to $330,000. Adding up the entire cost of this 200 by 200 feet structure of Mr. Poole's, the sum total amounts to $2,490,000, including book-cases, instead of $640,000. The cost per volume is $1.23, instead of 32 cents. So much for Mr. Poole's economy of cost.

Excessive cost of Mr. Poole's plan.

This brings me to Mr. Poole's *third claim*, namely: Economy of the "physical energy of attendants." He earnestly protests against the hardship imposed upon them, and demands its discontinuance. But he provides only one elevator and two flights of stairs for a four-story basement building, 200 by 200 feet on the ground, containing forty rooms. So that if an attendant is in search of a book which happens to be stored on any other floor but the one he is on at the time being, he may have to traverse the whole length of the building to reach the elevator; and on landing on the desired floor he may have to walk an equal distance from the elevator to the spot where the book is stored which he is looking for, and having gotten it he will have to make the same excursion back again. But there is also a superfluous waste of time involved in these perambulations on each floor and between the floors. The plan which was condemned by Mr. Poole provides two elevators and two flights of stairs in each book-room for the convenience of the attendants. Besides, a rise of 28 feet in any one of the many elevators will land the attendant in the fifth story, while it requires a rise of 60 feet to get to the fifth floor in Mr. Poole's arrangement.

Unnecessary hardship imposed upon the attendants by Mr. Poole's plan.

Having exposed the shallowness of Mr. Poole's random assertions and pretentious claims of economy in space, cost, and physical energy, I shall proceed to show his utter want of knowledge of the subject in almost every assertion he makes. He says, for instance, (which is true enough,) "*that any plan* "*for library construction is faulty which does not foresee and* "*provide for future enlargement.*" But he is not capable of comprehending the provisions made in my plan for that purpose, and therefore condemns them. On this subject two views can be taken, a broad one and a narrow one. The broad one leads to results like those observed in the Royal Public Library in Munich, Bavaria, which, on account of its liberal provisions for growth, engenders the envy of every librarian who ever visited it. This library contains 1,300,000 volumes, and there is available space enough left to accommodate double or treble that number of books without the necessity of constructing annexes or other enlargements so detrimental to libraries. I have always advocated this broad view as the most practicable, and in fact as the only one which is worthy of a great and prosperous nation. I have always opposed all makeshifts or petty subterfuges as unworthy of great enterprises. The narrow view leads to unseemly and doubtful efforts, calculated to bring odium upon the promoter, and to generate deep regrets at the result. The idea of constructing a National Library on the plan of an ordinary public and circulating library (the sole purpose of which latter seems to be cheapness and smallness) demonstrates a want of proper comprehension of the subject. To divide a library with a capacity of millions of volumes (which our library is expected to have) into 40, 50, 80, or 100 separate and poorly lighted rooms is surely a *very novel* arrangement, but no more so than thousands of similar novelties exhibited in the novelty room of the Patent Office.

Provisions for future enlargement.

The object of Mr Poole's plan cheapness and smallness.

The construction of annex after annex all around the original (200 x 200 ft.) building would prove to be a continual source of annoyance to readers and librarians, add to the inconvenience and confusion of the management, and, through the vapor from slacking lime, the stone, lime, and brick-dust, and other matter, do serious damage to the collection.

Annoyances caused by the construction of annexes, &c.

No façades presented by Mr. Poole.

As Mr. Poole has not presented any façades to his ground plan indicating his idea of what he terms "a simple, yet char- "acteristic design," no door is open for proper criticism of that feature of his "novelty;" but from the ground plan, though a crude one, it is easy to ascertain that his principles

The construction faulty and impracticable.

of construction want soundness and practicability. Judging from the lengths of the rooms and their widths, it is safe to say that Mr. Poole has evidently devoted no more time to the study of the principles involved in the construction of such a building as is under controversy than he has to the study of the principles involved in lighting, heating, or ventilating it, or in its economy of space, cost, physical energy, &c. A practical constructor will always avoid unnecessary risks, especially in iron constructions, as iron is much more subject to detrimental influences by fire than stone, brick, &c. The introduction of posts or piers for the support of great weights in long and wide rooms is obviously better than the trusting to iron girders of the length of 50 feet. Experience has taught us that iron girders, though they be ten or fifteen times stronger than required, and though they be protected by terra-cotta against fire, will lose sufficient tensile strength in certain cases to become dangerous factors. And it is a matter of doubtful expediency to load brick walls of great length and height with burdens so immense.

If to an inefficient lighting, a bad method of heating and ventilating, a preposterous waste of space, cost, and physical energy, a poor method of construction is added, the practicability of Mr. Poole's novelty seems to be reduced to its minimum.

Mr. Poole finally condenses his objections into seven paragraphs, which I find in no way touch my plan.

Mr. Poole's objections condensed; they do not touch the plan adopted.

In the matter of protection against destruction by fire, in the matter of providing spacious and convenient quarters for the management, in the provisions made for elevators for the attendants, in the matter of accommodations for readers, students, &c., and in the matter of utility and economy, my plan is very much the superior of Mr. Poole's. The ideas contained in his plan and omitted in mine, are two in number:

1st. To divide the library building into separate rooms,

each containing a special and distinct subject, having its particular corps of attendants, and excluding all spectators; and, 2d. To waste one-half of his available shelving space for the purpose of preventing destruction to books by heat and dust in the upper parts of the book-rooms.

But here are Mr. Poole's seven fundamental requirements:

Mr. Poole's seven fundamental requirements criticised.

"1. That the building shall be constructed in compart-
" ments, and as nearly fire-proof as is possible, so that if
" fire starts it shall be confined in the compartment in which
" it originates, and the rest of the library be saved."

The provisions for security against fire made in the adopted plan far exceed in efficiency those provided for in Mr. Poole's plan, as comparison will show.

"2. That waste room shall be reduced to a minimum;
" that convenience and utility shall never yield to architec-
" tural effect, and that the building shall be easily and
" economically heated."

The stupendous waste of available space for 2,500,000 volumes in Mr. P.'s plan is scarcely what may be called "re-
" ducing to a minimum." Believing in the axiom that utility is the first principle of design, I can never subordinate utility to architectural effect. As regards the easy and economical heating of the building I can only say that if Mr. Poole knew the system of heating and ventilating which I advocate, his investigation of "Library Architecture" would have been productive of much better results.

"3. That more spacious and convenient quarters than the
" librarians now have shall be provided for the administra-
" tive department and the working rooms of the library."

This paragraph has no bearing on the adopted plan at all, as the conveniences of this department will be entirely in the hands of the Librarian of Congress; the provisions thus far made are thought too liberal in that direction rather than the reverse.

"4. That there shall be no climbing of stairs for books
" and no overheating of bindings in galleries."

In the adopted plan every book repository is provided with

two elevators and two flights of stairs for the exclusive use of the attendants. The bindings in the galleries cannot become overheated by the use of the down-draft system which I advocate.

"5. That greater facilities of communication between "different parts of the library shall be secured, and that "the books shall be shelved near the floor, and no higher "than they can be reached without steps and ladder."

It does seem to a practical mind that a direct connection between a centrally located room (like the reading-room in the adopted plan,) where the management of the whole library takes place, and five or six adjoining rooms, which all radiate from this central room, would afford the best and most direct communication imaginable, especially if these adjoining rooms are open clear to the fifth story, and all of the stories of each room are connected with each other by two elevators and two flights of stairs. Certainly it ought to facilitate communication better than the scattering 40, 60, or 80 separate rooms, spread over from 40,000 to 60,000 square feet of ground, and four, five, or six stories high, with *two flights* of stairs and one elevator in the whole building. The books will not be benefited in the least by being shelved near the floor, and the shelves were in no case intended to be made any higher than they can be reached without steps or ladder.

"6. That quiet accommodations shall be provided for "readers; that separate rooms be assigned to special sub-"jects, and furnished with such special arrangements as "they need for their storage and use."

The accommodations for the general reader in my plan consist of an octagonal room 100 feet in diameter, which is just the size of the beautiful Picton reading-room in Liverpool. There are besides a number of larger and smaller separate rooms, assigned for special subjects and for the study of them; also separate rooms for Senators and members of the House of Representatives, (whom Mr. Poole has entirely forgotten.) Also rooms for the thousands of maps, charts, engravings, manuscripts, rare specimens of typography, &c. There are also liberal provisions made for the proper exhi-

bits of the numerous articles of the graphic arts (for which Mr. P. also forgot to provide) in the copyright department; also for the newspaper files, music, pamphlets, files, &c. One special room is set aside in a prominent part for a *Washingtoniana*. This is a room in which everything will be collected that pertains to the making up of a true and complete history of George Washington.

"7. That the cost of the construction shall be kept within "reasonable limits, and that convenience, utility, and econ- "omy shall be the controlling principles of design."

Mr. Poole will, it is to be hoped, excuse Congress for claiming the prerogative of deciding the matter of cost in this, as well as of any other Government structure. He already has my idea of his notions of economy and utility.

Mr. Poole's idea, as portrayed in his plan, may be practical and suitable for such libraries as he has had charge of, and with the management and necessities of which he is sufficiently acquainted, but surely he does not comprehend the many and vast requirements of a Congressional or National Library. That he must leave to others. If he understood them at all, he could not possibly have pushed his "200 *by* 200 *novelty*" to the foreground as a *model*, and have so boldly forced it to the attention of the public, when it has not even been tested by trial, much less approved by experience.

Librarians as architects.

But the greatest "novelty" perpetrated by Mr. Poole is his effort to procure the condemnation of the approved plans, (which, as has been shown, are the product of many years of labor, and which have gained the approbation of minds specially fitted to advise in such a case,) by calling to his aid a *plebiscite*, so to speak, of librarians, who, however fitted they may be to judge of the needs of the collections of books committed to their care in various parts of the country, cannot be expected to be, and certainly do not appear to be, competent to judge either upon questions of architectural science or upon the needs of a great national library.

"To correct an error one must have the authority to do "so, or the skill to prove it to be an error."

J. L. SMITHMEYER,
Architect.